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EXAMINER	
MAIS, MARK A	

ART UNIT	PAPER NUMBER
2619	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/045,348	SHIN ET AL.	
	Examiner	Art Unit	
	Mark A. Mais	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-18,22-30 and 33-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-18,22-30 and 33-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 13, 2007 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 17, and 25 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a host processor serially connected to a data store device, does not reasonably provide enablement for a multi-path packet-switched network [e.g., an IP

Network]. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims **[See Applicants' Specification, page 35, paragraph 00111 to page 37, paragraph 00115; Figs 16-18]**. For example, IP networks often use TCP/IP for packet transport which does not provide sequential-ordered delivery for one transmission stream along only one path. Such sequential-ordered delivery is often provided in a serial interface, a virtual channel (VC), virtual path (VP), or a tunnel (i.e., a Virtual Private Network (VPN) using MPLS). No support (or alternate embodiment) for protocol functionality [i.e., a VPN using MPLS] can be found in Applicants' Specification. Even if another type of network were used for packet transport, such as an ATM network, the sequential-ordered delivery might be the same in each direction with the setup and teardown of VC/VPs in each direction (for example, using constant bit rate (CBR) service contracts in both directions). There does not appear to be support in Applicants' Specification for one multi-path packet-switched network or one multi-path packet-switched network mechanism (or protocol support) which is capable of providing sequential-delivery along only one path in one direction and non-sequential-delivery over multiple paths in the other direction. Correction is required.

5. Claims 1, 17, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim language "in an order guaranteed to be sequential" and "in an order not guaranteed to be sequential" is indefinite. Without knowing what type of technology or protocol such claim language is used with, the examiner cannot determine what

type of sequential-order guarantees Applicants are claiming. Edge devices in an IP network receive packet transmissions and sequence or re-sequence packets to ensure proper output sequence without guaranteeing that all the packets in the transmission will be received [e.g., misrouted packets and/or those packets with expired time to live (TTL)]. Edge devices in ATM networks (which create VC/VPs) cannot guarantee that all the packets in the transmission will be received either. Is the guarantee low packet-storage latency or low bit error probability? Is the guarantee that there will be no dropped packets? Is the guarantee that all packets in one direction are sent and received in sequence [i.e., in a serial connection]? Is the guarantee that one side of the multi-path packet-switched network can sequence or re-sequence packets at the edge (while the other side cannot)—thus allowing error-filled transmissions (i.e., sequential errors) in one direction (from the data storage device) but suppressing error-filled transmissions in the other direction (from the host)? Is the guarantee that a transmission in one direction has a higher QOS priority than a transmission in the other direction [e.g., different ATM traffic contracts such as constant bit rate (CBR), variable bit rate (VBR), available bit rate (ABR), and unspecified bit rate (UBR)]? Is the guarantee that a transmission will have control packet pre-emption (over a data packet) in only one direction? Is the guarantee provided by using multi-protocol networks or multiple networks? Correction is required.

6. Claims 1, 17, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim language "along the same path" and along different paths" is indefinite. Without knowing what type of technology or protocol such language is used with,

the examiner cannot determine what "path[s]" Applicants is claiming. Having a serial interface to a receiving device allows all received packets received from an IP network to traverse the same path in at least the final leg of the trip [i.e., along the fiber channel serial interface]. Does "same path" mean using a VPN using MPLS? Does "same path" mean using the same VC within an ATM network's VP? Do "different paths" mean sending the packets through an IP network? Do "different paths" mean using different VCs within an ATM network's VP? Do "different paths" means using different buses in a multi-bus system?

7. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "a network having multiple paths" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim because "a network having multiple paths" is already in lines 1-2 (the preamble). For examination purposes, the examiner will interpret this limitation to mean one single network having multiple paths (and not a first and second network having multiple paths). Correction is required.

8. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17 recites the limitation "a switching network having multiple paths" in line 6. There is insufficient antecedent basis for this limitation in the claim because "a switching network having multiple paths" is already in lines 2-3 (the preamble). For examination purposes, the examiner will interpret this limitation to mean one single switching network having

multiple paths (and not a first and second switching network having multiple paths). Correction is required.

9. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 25 recites the limitation "a multiple path network" in lines 6-7. There is insufficient antecedent basis for this limitation in the claim because "a multiple path network" is already in line 1 (the preamble). For examination purposes, the examiner will interpret this limitation to mean one single multiple path network (and not a first and second multiple path network). Correction is required.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 5-18, 22-30 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Latif et al. (6,400,730).

12. With regard to claims 1, 5, 9, 13, and 15, Latif et al. discloses a method for transmitting packets through a network having multiple paths **[Fig. 2, interpreted as the combination of the fiber channel serial interface to the Fiber storage device, switch 35, and the IP network 60; IP networks have multiple paths]** between a first communications node **[Fig. 2, SoIP device 50]** and a second communications node **[Fig. 2, Fiber storage device]**, the method comprising:

transmitting from the first communications node to *a* network *having multiple paths* a first sequence of packets *associated with a transaction* **[Fig. 2, SoIP Device 50 (host—claim 5) transmitting packets to fiber channel serial interface/switch 35/IP network 60]**;

transmitting from the network to the second communications node the first sequence of packets in sequential order **[Fig. 2, packets are transmitted through fiber channel serial interface/switch 35/IP network 60 to Fiber storage device (data store device—claims 5, 9, and 15)]**;

transmitting from the second communications node to the network a second sequence of packets **[Fiber storage device transmits packets to fiber channel serial interface/switch 35/IP network 60]**; and

transmitting from the network to the first communications node the second sequence of packets in a non-sequential order **[Fig. 2, SoIP device 50 receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60; the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network]**

whereby sequential order is guaranteed when packets are received by the second communications node by *routing* the first sequence of packets along the same path in the network **[Fig. 2; Fiber channel requires a serial interface, col. 6, line 14; the fiber channel serial interface routes the packets along the same path at least from switch 35 to the Fiber Storage Device; this is also interpreted as guaranteed sequential order (one transmission is one transaction—claim 13; same path per transaction—claim 33)]** and is not guaranteed when packets are received by the first communications node **[Fig. 2, SoIP device 50 receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60; the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network]** by *routing* at least two packets of the second sequence of packets along different paths in the network.

Latif et al. discloses **[Fig. 2]** an SoIP device 50 which receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60. Furthermore, the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network **[Fig. 2]**. Latif et al. does not specifically disclose that at least two packets travel along different paths. However, it is well known in the art that packets traveling through an IP network can (and do) travel along different paths. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that packets would travel (be routed) along different IP network paths because that is the nature of an IP network which does not have any service guarantees (i.e., only uses "best effort" to get packets form one point to another without concrete guarantees on path, time, or sequence).

13. With regard to claims 17, 18, 23, and 24, Latif et al. discloses a method for transmitting packets from a first communications device **[Fig. 2, SoIP device 50]** to a second communications device **[Fig. 2, Fiber storage device]** across a switching network having multiple paths **[Fig. 2, interpreted as the combination of the fiber channel serial interface to the Fiber storage device, switch 35, and the IP network 60; IP networks have multiple paths]**, the method comprising:

routing a sequence of packets *associated with a single transaction* from the first communications device to the second communications device along a single path in *a* switching network *having multiple paths* **[Fig. 2, packets are routed to Fiber storage device (data store device—claims 23 and 24) from SoIP Device 50 through fiber channel serial interface/switch 35/IP network 60; the fiber channel serial interface routes the packets along a single path at least from switch 35 to the Fiber Storage Device]**

wherein the packets arrive at the second communications device in an order that is guaranteed to be sequential **[Fig. 2; Fiber channel requires a serial interface, col. 6, line 14; the fiber channel serial interface routes the packets along a single path at least from switch 35 to the Fiber Storage Device; this is also interpreted as guaranteed sequential order (one transmission is one transaction—claim 18; same path per transaction—claim 34)]**; and

routing a sequence of packets from the second communications device to the first communications device along multiple paths in the switching network **[Fig. 2, packets are routed to SoIP device 50 from Fiber storage device through fiber channel serial interface/switch 35/IP network 60; the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network]**;

wherein the packets arrive at the first communications device in an order that is not guaranteed to be sequential **[Fig. 2, SoIP device 50 receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60; the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network].**

Latif et al. discloses **[Fig. 2]** an SoIP device 50 which receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60. Furthermore, the IP network portion of packet delivery is interpreted as non-guaranteed sequential order due to multiple paths used in an IP network **[Fig. 2]**. Latif et al. does not specifically disclose that the packets transmitted from the second device to the first device travel along different paths. However, it is well known in the art that packets traveling through an IP network can (and do) travel along different paths. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that packets would travel (be routed) along different IP network paths because that is the nature of an IP network/cloud which does not have any service guarantees (i.e., only uses "best effort" to get packets form one point to another without concrete guarantees on path, time, or sequence).

14. With regard to claims 25, 26, 28, 29, and 30, Latif et al. discloses a device **[Fig. 2, switch 35 (claim 26)]** *for incorporation in a multiple path network* **[network 60 is interpreted as an ATM network, col. 6, lines 28-32; ATM networks have multiple paths]** *to transmit* packets of a transaction between a host **[Fig. 2, device 50]** and a data store device **[Fig. 2, Fiber storage device (claim 30)]** comprising:

a component **[Fig. 2, one port (claim 28) of switch 35 which is connected serially to Fiber storage device]** that receives in sequential order packets of a transaction that are to be transmitted from the host **[Fig. 2, receives packets over network 60; network 60 is interpreted as an ATM network, col. 6, lines 28-32; thus, it receives packets from device 50 over a VC which transports packets in sequential order (same path per transaction—claim 35)]** and transmits in sequential order the packets of the transaction to the data store device wherein the packets of the transaction arrive at the data store device in an order that is guaranteed to be sequential because the packets are routed along a single path *in a multiple path network* **[Fig. 2; Fiber channel requires a serial interface, col. 6, line 14; switch 35 transmits packets to Fiber Storage Device at least along a single path along the fiber channel serial interface; this is also interpreted as guaranteed sequential order]**; and

a component **[Fig. 2, multiple ports (claim 28) of switch 35 multiply-connected to ATM network 60; this switch is interpreted as multiple input/multiple output switch which utilizes multiple outputs for connection to ATM network 60 (and device 50—claim 29) and one serial output to fiber storage device]** that receives packets of a transaction from the data store device in non-sequential order **[e.g., the Fiber storage device (e.g., a RAID drive, col. 5, line 53) may transmit the packets out-of-sequential-order (due to errors such as a disk failure)]** and transmits the packets of the transaction to the host wherein the packets of the transaction arrive at the host in an order that is not guaranteed to be sequential because the packets are routed along multiple paths *in the multiple path network.*

Latif et al. discloses **[Fig. 2]** that packets are routed to device 50 from switch 35 through ATM network 60. It is well known in the art that data storage devices in an ATM network use an

unspecified bit rate (UBR) service contract. The use of UBR service contracts causes a high incidence of packet loss as well as delays. Thus, the ATM network may set up a first VC(1) from switch 35 to device 50 to transport the packets and then tear down the first VC(1). Packet loss or delay during transmission necessarily causes non-guaranteed sequential delivery depending on the severity of the packet loss (incomplete or corrupted messages due to traffic-shaping/packet-dropping-algorithms) or delay (certain applications will time-out). In this case, most applications will request re-transmission of the packets. Thus, the ATM network will set up a second VC(2) to re-transmit the packets from switch 35 to device 50 and then tear down the second VC(2). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that packets in one transaction which are transported using a UBR service contract through an ATM network would travel along different paths (either physically different paths or paths separated in time) because data storage devices often handle applications such as file-transfers (and e-mail) which tend to have a high tolerance for latency and packet loss but affirmatively modify transmission behavior based on the threshold for packet loss and delay.

15. With regard to claim 6, Latif et al. discloses SoIP Device 50 transmitting packets through fiber channel serial interface/switch 35/IP network 60 to Fiber storage device **[Fig. 2]**. Fiber channel requires a serial interface **[col. 6, line 14]**. Moreover, the fiber channel serial interface routes the packets along the same path at least from switch 35 to the Fiber Storage Device. This is also interpreted as guaranteed sequential order. Latif et al. does not specifically disclose caching data from a computer program write operation to a storage area network. It is well known in the art that computer programs can access storage area networks for both read and

write functions. Furthermore, a write sequence to a storage area network necessarily requires the data to be saved in cache or RAM until the data can be transmitted over the network. This is done to free up resources for multiple processes being executed by the processor executing the computer program. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that a host's write operation data would be cached during transmission to a storage network because of timing, propagation delays, and errors in transporting the data to the storage area network.

16. With regard to claim 7, Latif et al. discloses **[Fig. 2]** an SoIP device 50 which receives packets from Fiber Storage Device through fiber channel serial interface/switch 35/IP network 60. Furthermore, IP network delivery of packets is interpreted as non-guaranteed sequential order due to multiple paths in an IP network **[Fig. 2]**. Latif et al. does not specifically disclose halting the execution of a computer program until it receives necessary data form a data storage network. However, it is well known in the art that packets traveling through an IP network can (and do) travel along different IP network paths because that is the nature of an IP network/cloud which does not have any service guarantees (i.e., only uses "best effort" to get packets form one point to another without concrete guarantees on path, time, or sequence). It is also well known in the art that computer programs can access storage area networks for both read and write functions. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that that a processor would halt execution of a program (read operation) until it received the correct/timely data needed for further execution of the program because the data might be

delayed/unreadable due to propagation delays, out-of-sequence or re-sequencing delays, or dropped packets during that read operation.

17. With regard to claim 8, Latif et al. discloses that the second communications node does not have a capability to reorder a sequence of packets **[Fig. 2, fiber storage device; since fiber is transmitted serially, it does not need to perform packet re-sequencing; this is interpreted as not having the capability to reorder a sequence of packets]**.

18. With regard to claim 10, Latif et al. discloses that the first communications node has a capability to reorder a sequence of packets **[Fig. 2, SoIP devices 50 within SoIP storage area network, col. 6, lines 6-8; since SoIP device 50 works using IP, it necessarily needs to re-sequence packets received out of order from the IP network; this is interpreted as having the capability to reorder a sequence of packets]**.

19. With regard to claims 11 and 12, Latif et al. discloses that the network includes switches that transmit the packets of the second sequence on different paths to effect load balancing **[routing within IP networks is performed by switches and routers (col. 17, lines 12-16) using load balancing (col. 17, lines 10-12) with respect to the detected "conversations" (related frames , col. 16, lines 55-57 (same transaction—claim 12)); this is interpreted as the load-balanced transmission of packets from Fiber storage device to SoIP 50 through fiber channel serial interface/switch 35/IP network 60]**.

20. With regard to claims 14, 22, and 27, Latif et al. discloses that the first communications node, the second communications node, and the network are part of a storage area network **[Fig. 2; col. 6, lines 6-8]**.

21. With regard to claim 16, Latif et al. discloses that the second communications node does not have an ability to reorder packets of a transaction **[Fig. 2, fiber storage device; since fiber is transmitted serially, it does not need to perform packet re-sequencing; this is interpreted as not having the capability to reorder a sequence of packets]**.

Response to Arguments

22. Applicant's arguments filed on December 13, 2007, have been fully considered but they are not persuasive.

23. With regard to claims 1, 17, and 25, Applicants state that Latif et al. does not disclose the a multi-path network capable of transmitting packets in one path with guaranteed sequential order and transmitting non-guaranteed sequential-order packets along multiple paths in the reverse direction [See applicants' Amendment dated December 13, 2007, page 7, paragraph 4 to page 8, paragraph 2]. The examiner respectfully disagrees for the reasons noted in the rejections of claims 1, 17, and 25 under 35 U.S.C. 103(a) above.

24. Additionally, the examiner notes the rejection of the claims 1, 17, and 25 under 35 U.S.C. 112, first and second paragraphs. It appears to the examiner that the resolution of these rejections will aid both the Applicants and the examiner in the prosecution of the current Application.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Collete et al. (USP 7,308,001), Fibre channel frame batching for IP transmission.

(b) Iyer et al. (USP 7,307,995), System and method for linking a plurality of network switches.

(c) Fibre channel implementation using network processors.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Mais whose telephone number is 572-272-3138. The examiner can normally be reached on M-Th 5am-4pm.

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing F. Chan can be reached on 571-272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAM

December 13, 2007

1/2/08

WING CHAN
SUPERVISORY PATENT EXAMINER